Differences of Soil Properties in Various Agricultural Practices in Western Kentucky

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Abstract

Cropping systems in Kentucky are strongly dominated by corn, tobacco, soybeans and wheat. Various crop management practices affect soil properties resulting in different functional quality of the soil to support crop growth. Crop rotation and tillage practices influence soil properties, and understanding the effect of these practices is essential to maintaining optimal soil environment. Therefore, the objective of this research is to determine the differences of soil properties in various agricultural practices in western Kentucky on soil chemical and physical properties. In addition, soil samples from pasture, wood, and garden practices will be collected to use as a reference for comparison among disturbed versus undisturbed fields. The study sites will be selected from Caldwell County, there will be Six cropping systems identified, such as Monoculture systems (MS), Crop rotation Systems (CRS), Tobacco Cropping Systems (TCR), Corn/Soybean – cover crop (CC), Corn/Soybean-wheat (CSW), and three undisturbed fields (pasture, forest, and garden). Soils will be sampled on October First. Undisturbed and disturbed samples will be cut in the fields at depths of 0-7 cm, 7-15 cm. Undisturbed samples will be collected using soil core (ring sample), while disturbed samples will be taken using hand trawl. The samples will be kept in the refrigerator until analysis. The undisturbed soil samples will be used to analyze bulk density, porosity, macroporosity, water holding capacity. The disturbed samples will be used to analyze SOM, soil pH and water stable aggregates (WAS). All the procedures both in the field and the lab will follow as mentioned in Handayani (2004). Soil compaction will also be directly measured in the field using penetrometer. Data from this study will be analyzed using the ANOVA. The least significant differences (LSD) values will be reported at a level (α)= 0.10. The correlation will be used to evaluate the relationship between SOM and other soil properties.

Keywords: Bulk Density, Porosity, Macroporosity, Water holding capacity, SOM, Soil pH, Water Stable Aggregates.